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Applied Number Theory

- **First book that covers all four areas: cryptography, coding theory, quasi-Monte Carlo methods, pseudo-random numbers**
- **Contains material for courses on number theory, cryptography, coding theory and quasi-Monte Carlo methods**
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This textbook effectively builds a bridge from basic number theory to recent advances in applied number theory. It presents the first unified account of the four major areas of application where number theory plays a fundamental role, namely cryptography, coding theory, quasi-Monte Carlo methods, and pseudorandom number generation, allowing the authors to delineate the manifold links and interrelations between these areas. Number theory, which Carl-Friedrich Gauss famously dubbed the queen of mathematics, has always been considered a very beautiful field of mathematics, producing lovely results and elegant proofs. While only very few real-life applications were known in the past, today number theory can be found in everyday life: in supermarket bar code scanners, in our cars' GPS systems, in online banking, etc. Starting with a brief introductory course on number theory in Chapter 1, which makes the book more accessible for undergraduates, the authors describe the four main application areas in Chapters 2-5 and offer a glimpse of advanced results that are presented without proofs and require more advanced mathematical skills. In the last chapter they review several further applications of number theory, ranging from check-digit systems to quantum computation and the organization of raster-graphics memory. Upper-level undergraduates, graduates and researchers in the field of number theory will find this book to be a valuable resource.

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